

WHAT IS CLAIMED IS:

5

1. A semiconductor apparatus fabrication method, comprising the steps of:

forming a resist pattern;

10 forming a film whose heat-resistance temperature is higher than softening temperature of said resist pattern so as to cover said resist pattern;

15 heating said resist pattern at a temperature higher than said softening temperature of the resist pattern and lower than said heat-resistance temperature of the film in a state where said film covers said resist pattern in order to cause reflow;

removing said film; and

20 patterning an underlayer of said resist pattern by using said resist pattern in which said reflow is caused as a mask.

25

2. The semiconductor apparatus fabrication method as claimed in claim 1, wherein said film is an organic film whose softening temperature, which serves as said heat-resistance temperature, is higher than said softening temperature of the resist pattern.

35

3. The semiconductor apparatus

fabrication method as claimed in claim 2, wherein said organic film is soluble in one of an organic solvent and water.

5

4. The semiconductor apparatus
fabrication method as claimed in claim 3, wherein
10 said organic film is selected from a group of
polyacrylic acid, polyvinylacetal,
polyvinylpyrrolidone, polyvinylalcohol,
polyethyleneimine, polyethyleneoxide, styrene-
(anhydrous) maleic acid copolymer, methylvinylether-
15 (anhydrous) maleic acid copolymer, polyvinyl amine
resin, polyallylamine, water soluble oxazoline group
containing resin, water soluble melamine resin,
water soluble urea resin, alkyd resin, and
sulfonamide resin.

20

5. The semiconductor apparatus
25 fabrication method as claimed in claim 3, wherein
said organic film is selected from a group of
polyimide, polyacetal, polybutylene terephthalate,
polyethylene terephthalate, syndiotactic polystyrene,
poly phenylene sulfide, polyetherether ketone,
30 liquid crystal polymer, fluorine resin,
polyethernitrile, polycarbonate, modified poly
phenyleneether, polysulfone, polyethersulfone,
polyacrylate, polyallylate, polyamide-imide,
thermoplastic polyimide, phenol resin, urea resin,
35 melamine resin, alkyd resin, unsaturated polyester,
epoxy resin, diallyl phthalate resin, silicon resin,
and polyurethane.

5 6. The semiconductor apparatus
fabrication method as claimed in claim 2, wherein
said step of forming the film includes a coating
step.

10

 7. The semiconductor apparatus
fabrication method as claimed in claim 1, further
15 comprising a step of accreting a release agent on a
surface of said resist pattern after the step of
forming the resist pattern and before the step of
forming the film.

20

 8. The semiconductor apparatus
fabrication method as claimed in claim 1, wherein
25 said film is an inorganic film whose melting point,
which serves as said heat-resistance temperature, is
higher than said softening temperature of the resist
pattern.

30

 9. The semiconductor apparatus
fabrication method as claimed in claim 8, wherein
35 said inorganic film is formed in accordance with one
of a coating method, a sputtering method and a
plasma CVD method.

5 10. The semiconductor apparatus
fabrication method as claimed in claim 1, wherein
said film is a metal film whose melting point, which
serves as said heat-resistance temperature, is
10 higher than said softening temperature of the resist
pattern.

15 11. The semiconductor apparatus
fabrication method as claimed in claim 10, wherein
said metal film is formed in accordance with a
sputtering method.

20

 12. The semiconductor apparatus
fabrication method as claimed in claim 1, wherein
25 said resist pattern is formed as a convex pattern on
said underlayer.

30

 13. The semiconductor apparatus
fabrication method as claimed in claim 1, wherein
said resist pattern has an aperture for exposing
said underlayer.

35

14. The semiconductor apparatus
fabrication method as claimed in claim 1, wherein
said underlayer is a semiconductor film.

5

15. The semiconductor apparatus
10 fabrication method as claimed in claim 1, wherein
said underlayer is an inorganic insulation film.

15

16. The semiconductor apparatus
fabrication method as claimed in claim 1, wherein
said underlayer is an organic insulation film.

20

17. The semiconductor apparatus
fabrication method as claimed in claim 1, wherein
25 said underlayer retains an antireflection film.

30

18. The semiconductor apparatus
fabrication method as claimed in claim 1, further
comprising a step of patterning a film under said
underlayer by using said underlayer as a mask.